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(71) Applicant : **Berthold, Johannes Theodoor
Dietrich
Rietdekkerweg 25
NL-7213 XM Gorssel (NL)**

(72) Inventor : **Berthold, Johannes Theodoor
Dietrich
Rietdekkerweg 25
NL-7213 XM Gorssel (NL)**

(74) Representative : **Morel, Christiaan F., Ir.Dr. et al
Kerklaan 37, Postbus 10482
NL-7301 GL Apeldoorn (NL)**

(54) Device for pneumatic milking, and teat cup for such a device.

(57) Method and device for pneumatic milking of cows. The device comprising a system of teat cups which are connected to a milk line, each cup being provided with a connection to a source of alternating vacuum. The milk line (7) from each teat cup (2) at a point near the liner (5) is provided with a branch (9) which is connected by way of a shut-off valve (10) to a line (11) for the supply of a cleaning medium. Method for cleaning a system of teat cups of a device for pneumatic milking of cows which consists in that after removal of the teat cups from a cow (3), on ending of a milking operation, the inside of each of the teat cups (2) is flushed with a flushing fluid. The teat cups (2) are flushed with their open end (6) downwards.

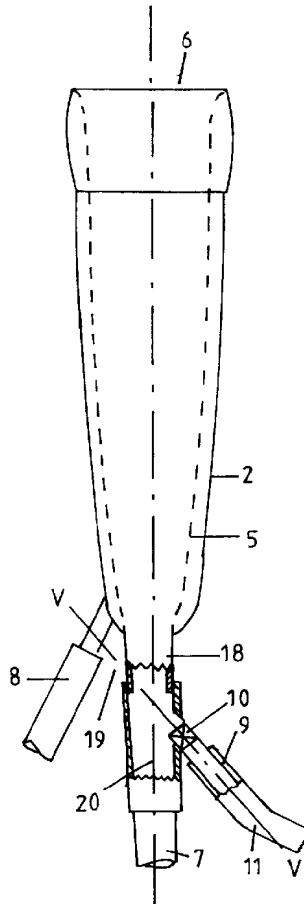


FIG 3

Jouve, 18, rue Saint-Denis, 75001 PARIS

The invention relates to a device for pneumatic milking of cows, comprising a system of teat cups which are each provided with a liner which is open at one end and at the other end is connected to a milk line, each cup being provided with a connection to a source of alternating vacuum. Such a device has already been known in practice for many years, and is also in general use.

The cup system here generally comprises four cups, the liner of which is integral with at least a first fixed part of a milk line. These parts lead to a collection unit to which the main milk line (with the pulsating pressure) is also connected. Such a cup system is made to interact with the teats of the udder of a cow to be milked. As soon as the milking has been finished, the teat cups are detached, and the whole unit is placed in a rest position in the operator's working pit. In this position, each teat cup is suspended upside down and the milk residues are able to collect in the mouth of the cup liner.

A method and a device for disinfecting the interior of a teat cup on completion of the milking cycle, at the time when the teats of the cow's udder are still in the teat cups, are known per se from German Patent Application DE 2,622,794. According to the theory described in that patent, the teat must be cleaned well and disinfected when the milking operation has been completed. However, this method and device have the great disadvantage that when the teat cups are used for milking the next cow the inside of the teat cups still contains disinfectant fluid. Besides, the teat cup is only cleaned in part, namely the part which is freely accessible to the disinfecting fluid at the time when the teat is still in the teat cup.

It has, however, been found that when the teat cups are removed from the cow and the teat cups are then hanging down in order to shut off the milk discharge from the teat cups, milk residues collect in the liner near the open end of each teat cup.

When the next cow comes in, the cup system is fitted on this cow and milking is resumed. It has, however, been found that the milk residues collecting can cause chemical or bacteriological contamination in the teat cup, which can mean that, for example, infections are transmitted from one cow to another. It is therefore advisable to ensure that bacilli in the cup liner are avoided. Cleaning by hand is very time-consuming and laborious, and is therefore often not carried out in practice. The method of disinfecting described in the abovementioned German Patent Application DE 2,622,794 also disinfects only a part of the interior of the teat cup, namely the part lying between the milk outflow aperture and the end of the teat in the teat cup.

The object of the invention is to provide a cleaning system which can be put into operation with little time loss and without much difficulty, so that each new cow can come into contact only with a completely

cleaned cup system. This object is achieved according to the invention through the fact that the milk line from each teat cup at a point near the liner is provided with a branch which is connected by way of a shut-off valve to a line for the supply of a cleaning medium.

This measure ensures that each cup system which is in the release position can be cleaned by supplying a cleaning medium for a short time through the abovementioned branch. The use of some excess pressure in the cleaning medium means that the shut-off valve can be opened by it and the cleaning carried out.

In an advantageous embodiment of the present device the medium supply lines of all teat cups of a system are connected to a collection unit to which at least one line for supply of the cleaning medium is also connected. This collection unit can be used by additionally connecting a line to it for the supply of a flushing and/or drying medium, such as water or compressed air. In this way cleaning can be carried out in two phases.

The sole right also extends to a teat cup for use in the device described above, which teat cup is provided in a manner which is known per se with a liner which is integral with at least a first part of a milk line. This teat cup is characterised in that a branch is present in this part of the milk line near the liner, in which branch a non-return valve opening in the direction of the milk line is fitted.

The above features and further features of the invention which will be explained in greater detail later are explained with reference to the drawing, which shows an embodiment of the device, of a teat cup, and of a cup system.

Fig. 1 shows a part of the cow with a cup system fitted on the udder.

Fig. 2 shows the cup system of Fig. 1 in the idle position.

Fig. 3 shows on an enlarged scale a teat cup according to the present proposal.

Fig. 4 shows a detail on an enlarged scale of the system from Fig. 2.

Fig. 5 is a cross-section on a greatly enlarged scale along the line V-V in Fig. 3 of the non-return valve used therein.

Fig. 2 shows the cup system 1, which is in the so-called rest position, with the teat cups 2 hanging down. The same system is shown in Fig. 1 in the working phase, in which the teat cups 2 are placed on the teats (not visible) of the udder 3 of the cow 4.

Fig. 3 shows that each teat cup 2 is provided with a liner 5 which is open at the free end 6, and is connected at the other end to a milk line 7. Each cup 2 is provided with a connection 8 to a source (not shown) of alternating vacuum. Thus far the cup system 1 described corresponds to the known prior art.

The object of the present proposal is to provide an effective solution to the risk of undesirable pollu-

tion or even infection of the interior of the teat cups 2 during the idle period of the cup system 1 (situation shown in Fig. 2). For this purpose, the device is characterised in that the milk line 7 of each teat cup 2 is provided with a branch 9 at a place near the liner 5. This branch is provided with a shut-off valve 10, and is further connected to a line 11 for the supply of a cleaning medium. This shut-off valve 10 is designed in such a way that if any excess pressure occurs in the cleaning medium inside the line 11, said valve opens, so that the cleaning medium fed in can flush out the inside of the liner 5. The valve 10 will therefore generally be in the form of a non-return valve, as will be explained in greater detail with reference to Fig. 5.

The medium supply lines 11 of all teat cups 2 of a system 1 are connected to a distribution unit 12, as can be seen in Fig. 2, and as shown enlarged in Fig. 4. A narrow supply line which connects a collection unit 14 to the distribution unit 12 runs to said distribution unit 12. This collection unit 14 is provided with three supply valves 15, to each of which a line 16 is connected. A cleaning medium can be fed in under pressure through one of the three lines 16, while flushing water and compressed air can be supplied through one of the other lines 16. The valves 15 can be controlled independently and can be operated electromagnetically and thereby receive a signal from a manually operated contact button. It is even possible to accommodate these valves 15 in a fully automatic programming which goes into action when the cup system 1 is removed from the udder 3 of a cow 4. After closure of the valves 15 the pressure inside the collection unit - and thus in the supply lines 11 - falls off, and the non-return valves 10 can close under the influence of a spring 17 which is provided.

As can be seen best in Fig. 3, the branch 9 is situated in the first part 18 of the milk line 7, so that the cleaning and/or flushing medium fed in impinges directly on the inside wall of the liner 5, and from there it flows to the free end or mouth 6, at which last point the risk of pollution or infection is greatest. The non-return valve 10 is adjacent to this first part 18 of the milk line 7, and at the same time takes up a position such that the supply stream of cleaning medium passing through this valve has a direction component to the mouth 6 of the liner 5. In this position, the axis 19 of the non-return valve 10 is able to intersect the axis 20 of the milk line 7. This means that the cleaning fluid is squirted slightly tangentially, so that this medium will move helically along the inside of the line part 18 and then along the inside of the liner 5. This has a beneficial effect on the cleaning action of the medium.

Fig. 5 shows on an enlarged scale a longitudinal section of the non-return valve 10, which is of conical shape. This means that the supply stream of cleaning medium inside the part 18 of the milk line 7 will gush inwards in the form of a surface of a cone. A number

of holes 21 in the guide wall 22 of the valve body 23 guarantee an adequate throughput of the cleaning medium from the line 11. In this connection it is pointed out that any suitable cleaning agent can be used, and that, under certain conditions, it is sufficient to flush the teat cups with clean water, it being possible to use compressed air finally for drying the inside of the liner 5.

The dairy farmer who is used to using a conventional pneumatic milking unit does not in this case need to make any change in his method, since the cleaning according to the present proposal is carried out during the non-active period of the cup system, i.e. in the situation shown in Fig. 2. The valves 15 can be opened and closed by means of remote-controlled operating devices 24 (see Fig. 4).

Claims

1. Device for pneumatic milking of cows, comprising a system of teat cups which are each provided with a liner which is open at one end and at the other end is connected to a milk line, each cup being provided with a connection to a source of alternating vacuum, **characterised in that** the milk line (7) from each teat cup (2) at a point near the liner (5) is provided with a branch (9) which is connected by way of a shut-off valve (10) to a line (11) for the supply of a cleaning medium.
2. Device according to Claim 1, **characterised in that** the medium supply lines (11) of all teat cups (2) of a system (1) are connected to a collection unit (12) to which at least one line (16) for the supply of the cleaning medium is also connected.
3. Device according to Claim 2, **characterised in that** the collection unit (12) also has connected to it a line (16) for the supply of a flushing and/or drying medium, such as water or compressed air.
4. Device according to Claim 4, **characterised in that** the collection unit (14) is provided with independently controlled supply valves (15) in the passage for both the cleaning medium and the flushing and/or drying medium.
5. Teat cup for use in the device according to one of the preceding claims, provided with a liner which is integral with at least a first part of a milking line, **characterised in that** a branch (9) is present in this part (18) of the milk line (7) near the liner (5), in which branch a non-return valve (10) which opens in the direction of the milk line is fitted.
6. Teat cup according to Claim 5, **characterised in that** the non-return valve (10) adjoins the first

part (18) of the milk line (7) and assumes such a position that the supply stream of cleaning medium passing through this valve has a direction component towards the mouth (6) of the liner (5).

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7. Teat cup according to Claim 5 or 6, **characterised in that** the non-return valve is of conical shape, so that the supply stream of cleaning medium gushes into the milk line in the form of the surface of a cone.

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8. Teat cup according to one of Claims 5 - 7, **characterised in that** the axis (19) of the non-return valve (10) intersects the axis (20) of the milk line (7).

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9. Cup system, made up of teat cups according to one of Claims 5 - 8, provided with a collection unit according to Claims 2 - 4, **characterised in that** the supply valves (15) are provided with remote-controlled operating means (24).

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10. Method for cleaning a system of teat cups of a device for pneumatic milking of cows, **characterised in that** after removal of the teat cups from a cow (3), on ending of a milking operation, the inside of each of the teat cups (2) can be flushed with a flushing fluid.

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11. Method according to Claim 10, **characterised in that** the teat cups (2) are not flushed until after they are hanging with their open end (6) downwards, thus in the so-called rest position.

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12. Method according to one of Claims 10 or 11, **characterised in that** after the first flushing operation the inside of the teat cup is then blown clean with compressed air.

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13. Method according to one of Claims 10, 11 or 12, **characterised in that** each teat cup alternately is flushed several times with clean water and dried with compressed air.

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14. Method according to one of Claims 10, 11, 12 or 13, **characterised in that** during one of the flushing operations another fluid, for example a cleaning fluid, is squirted through the teat cups.

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FIG 1

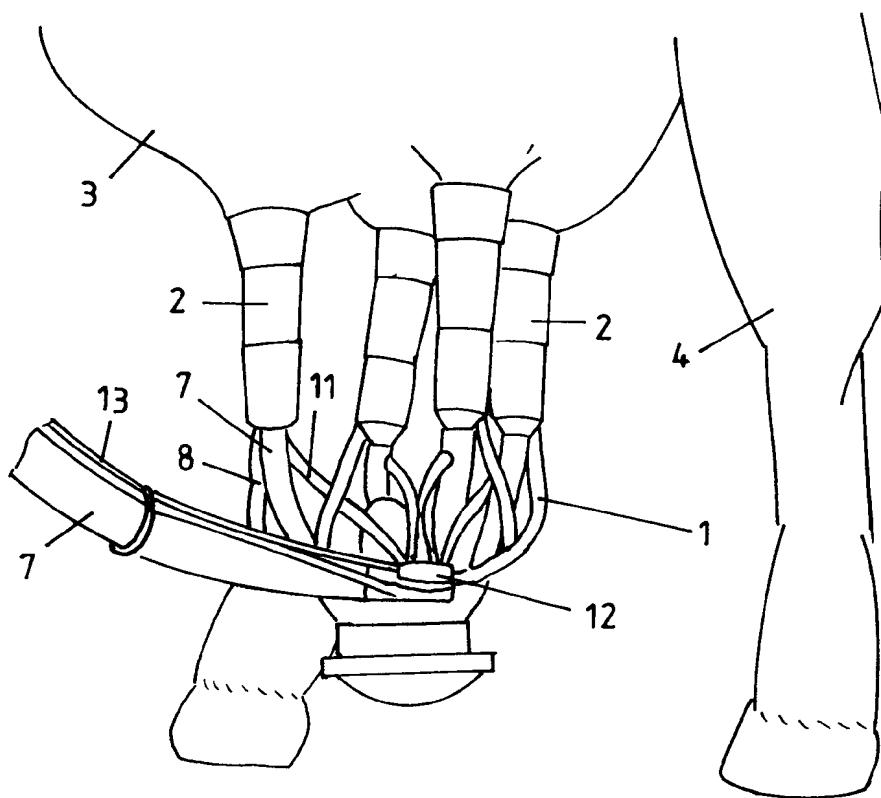


FIG 2

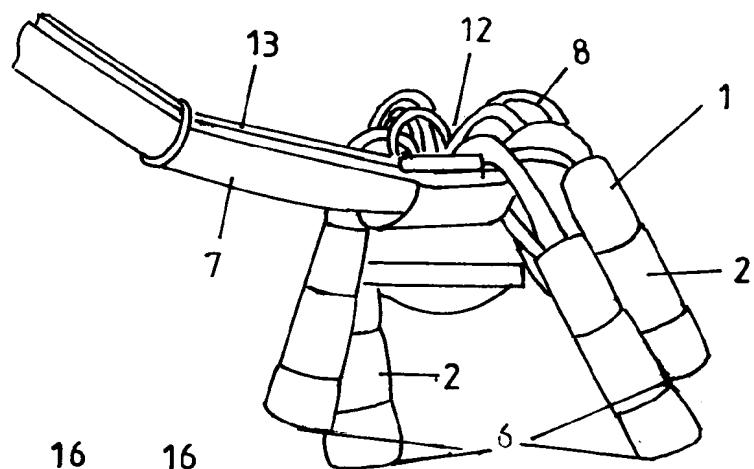
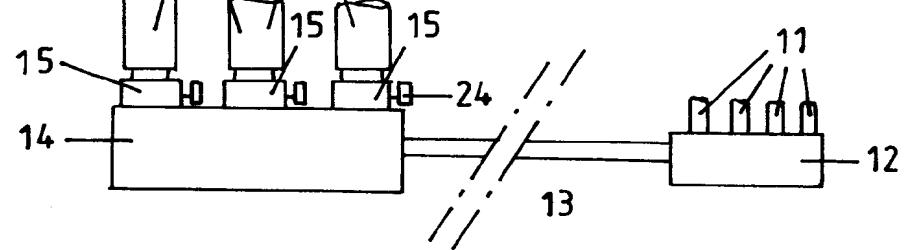
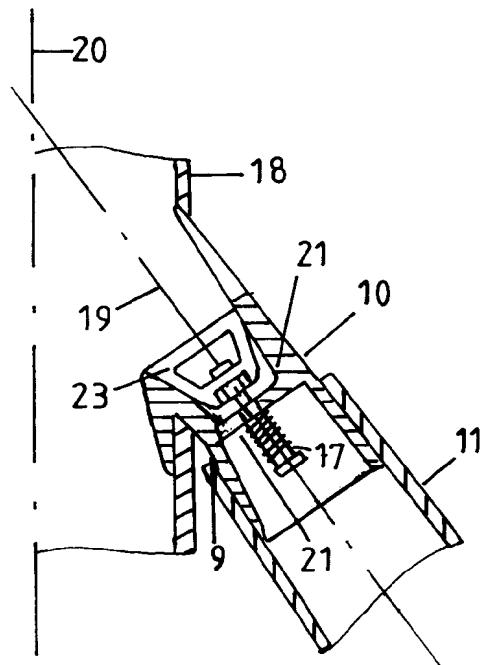
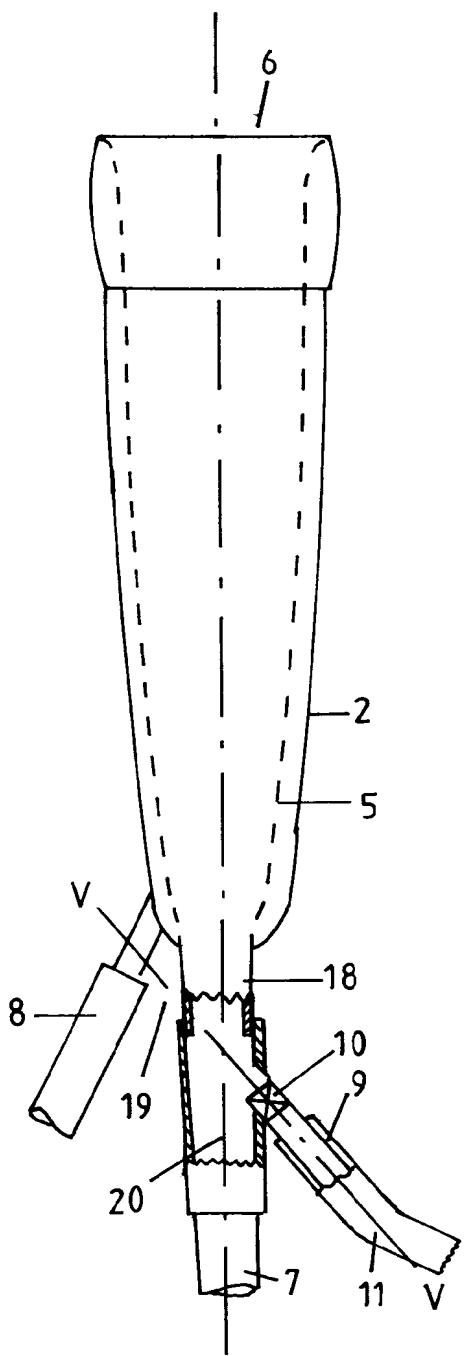


FIG 4







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EUROPEAN SEARCH REPORT

Application Number

EP 92 20 3536

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	EP-A-0 213 660 (MULTINORM B.V.) * page 5, line 8 - line 16; figure 2 *	10,11	A01J7/00 A01J5/08
Y	---	12-14	
X	GB-A-1 214 047 (RESEARCH CORPORATION) * page 3, line 59 - line 76; figures 2,3 *	10,11	
D,Y	DE-A-2 622 794 (ALFA-LAVAL AGRAR GMBH) * page 11, last paragraph - page 14, paragraph 1; figure 1 *	1,2,5-8	
Y	US-A-4 263 875 (J. MAIER ET AL.) * column 6, line 51 - line 61; figures 3,4 *	1,2,5-8	
Y	---	12-14	
A	EP-A-0 332 231 (C. VAN DER LELY) * column 7, line 26 - line 43; figure 10 *	1,5	
A	EP-A-0 277 396 (MULTINORM B.V.) * column 1, line 49 - column 2, line 22; figures *		TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A	EP-A-0 385 539 (C. VAN DER LELY) * column 11, line 51 - line 54 *	9	A01J
A	GB-A-1 017 567 (NEW ZEALAND GOVERNEMENT PROPERTY CORPORATION)		

The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
THE HAGUE	25 FEBRUARY 1993	MARANGONI G.	
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	